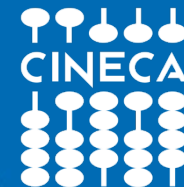


# SCAI SuperComputing Application & Innovation

for industry 4.0

Sanzio Bassini

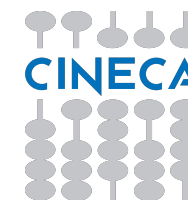


# The Consortium

- Private non for Profit Organization
- Founded in 1969 by Ministry of Public Education now under the control of Ministry Education, University and Research
- 70 Universities
- 3 Institutions
- The Ministry of Education University and research
- The National Research Council
- Main premises in Bologna, point of presence in Milan and Rome
- Annual budget: approx. 100M €
- Employees: approx. 700



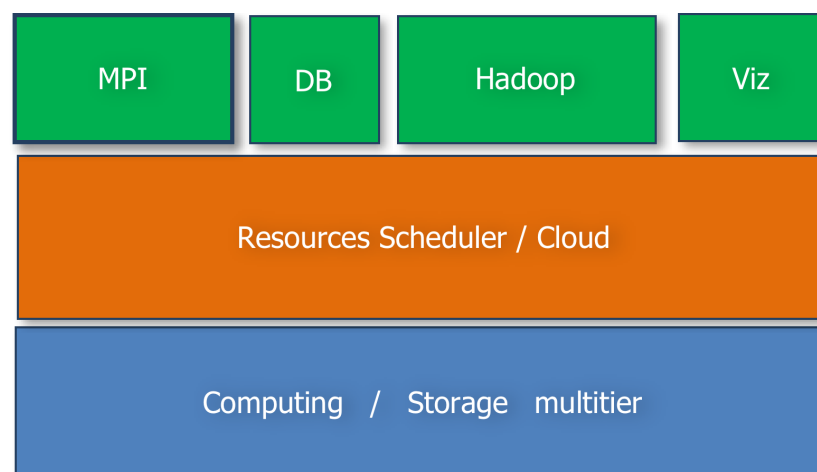
# Roadmap



Logical Name	Tier 0 - FERMI (June 2012)	Tier 1 - GALILEO (December 2014)	Big data - PICO (October 2014)
Peak Performance	~ 2 Pflops; ~ 5 PByte	~ 0,5 Pflops	~ 0,3 Pflops; ~ 15 Pbyte

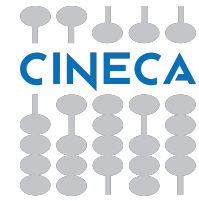
Logical Name	MARCONI (2016 / 2017)	BIG DATA (2016)
Peak Performance	~ 20 Pflops; ~ 15 Pbyte	~1 Pflops; ~ 20 Pbyte

Logical Name	Tier 0 BIG DATA (2019 – 2020)
Peak Performance	<< 50 Pflops; < 50 Pbyte on line storage; << 50 Pbyte repository



- Open access peer review: PRACE, ISCRA, LISA
- Partnership:
  - National Research Institute: INFN (high energy physics), OGS (oceanography and geophysics), IIT (technology), INAF (astrophysics), ICTP (theoretical physics), INGV (geophysics and volcanology)
  - Beyond the consortium relationship special collaboration agreement with: Polytechnic of Milan, Milan Bicocca University, Alma Mater University of Bologna, La Sapienza University of Rome, SISSA in Trieste, University of Modena...
- Open Innovation for Industries and SME
  - Co-founding Fortissimo at EU level, PRACE SHAPE action, Lisa for innovation at regional level in Italy.

# European funded R&D



E-infrastructure:



Energy efficiency



Exascale technology



Center of Excellence



CFD



Human Brain Project

Fabric of the future



FORTISSIMO

Bioengineering

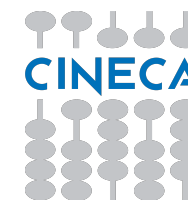


Rights Information Infrastructure

Multimedia / Cultural Heritage



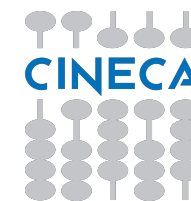
# Collaborations with qualified national players



- Eni E&P Research
  - HPC system management
  - Production management
  - Applications development
  - Innovation technology
- Civic protection / Meteorology
  - Operation numerical weather forecast
  - Data Post processing
- ARPA – Regional Agency for Environment Protection
  - Environmental numerical forecast
- UnipolSAI Assurance company
  - Risk management
  - Big data
- ISTAT National Institute of Statistics
  - Web crawlers
  - Predictive analysis
- Telethon Foundation for the curation of rare diseases
  - Integrated peer review
  - Repository genomic data

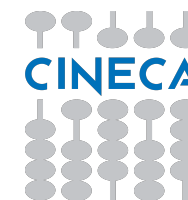


# Human Technopole – National Flagship project



- 10 years project; 1 Billion Euro of assured funds
- 7 facilities located in EXPO area in Milan
  - Onco genomics
  - Neuro Genomics
  - Agri Food and Nutrition Genomics
  - Computational life science
  - Center for Analysis, Decisions and Society
  - Centre for smart materials and device
- 3 Main infrastructures
  - Genomics Facility
  - Imaging Facility
  - Data Storage and HPC Cineca Facility

# Presence in Europe



## PRACE - Partnership for Advanced Computing in Europe

- The PRACE AISBL is a fully self-financed non-for-profit organization under Belgian law.
- 25 member countries (October 2012): Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, **Italy**, The Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the UK.
- **Italian Delegate: Giovanni Erbacci**
- Italian Advisory: **Salvatore La Rosa – MIUR**



## ETP4HPC – European Technology Platform for HPC

- Incorporated as a Dutch association
- Steering board with 15 members:
  - Research centers (5): BSC, CEA, **Cineca (Delegate Carlo Cavazzoni)**, Fraunhofer, FZJ Juelich
  - European SMEs (4): Allinea, ClusterVision, Megware, ParTec
  - European controlled corporations (4): ARM, Atos/Bull, Eurotech, Seagate
  - International companies with R&D in Europe (2): IBM, Intel
- Chairman: Atos/Bull
- ETP4HPC has a Virtual office based in: France - CEA; Germany - Partec; Italy - **Cineca** ; Spain - BSC; The Netherlands - SurfSARA).

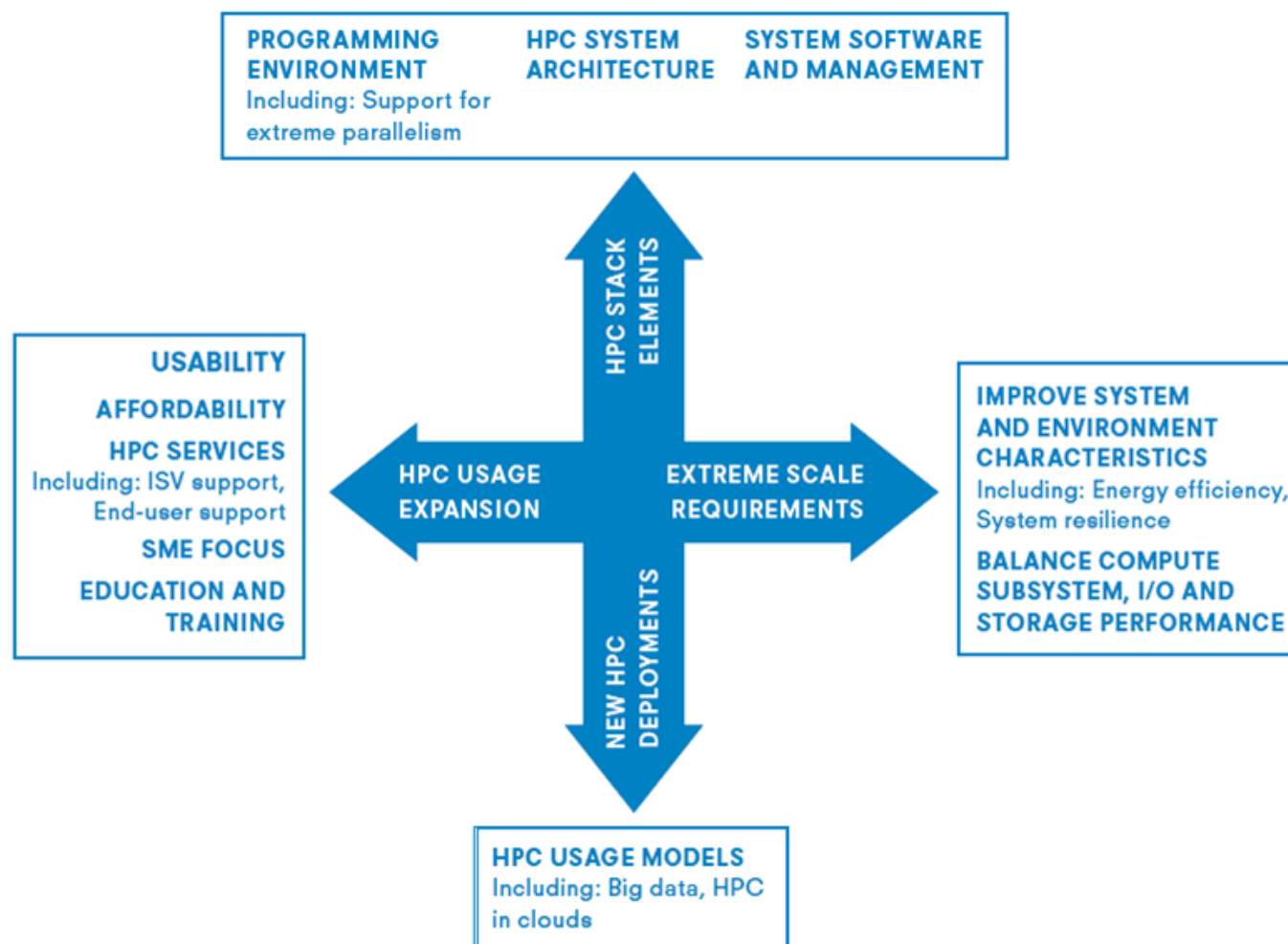
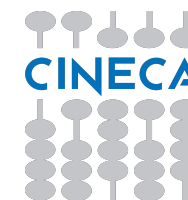


## BDVA – European Technology Platform Big Data Value Association

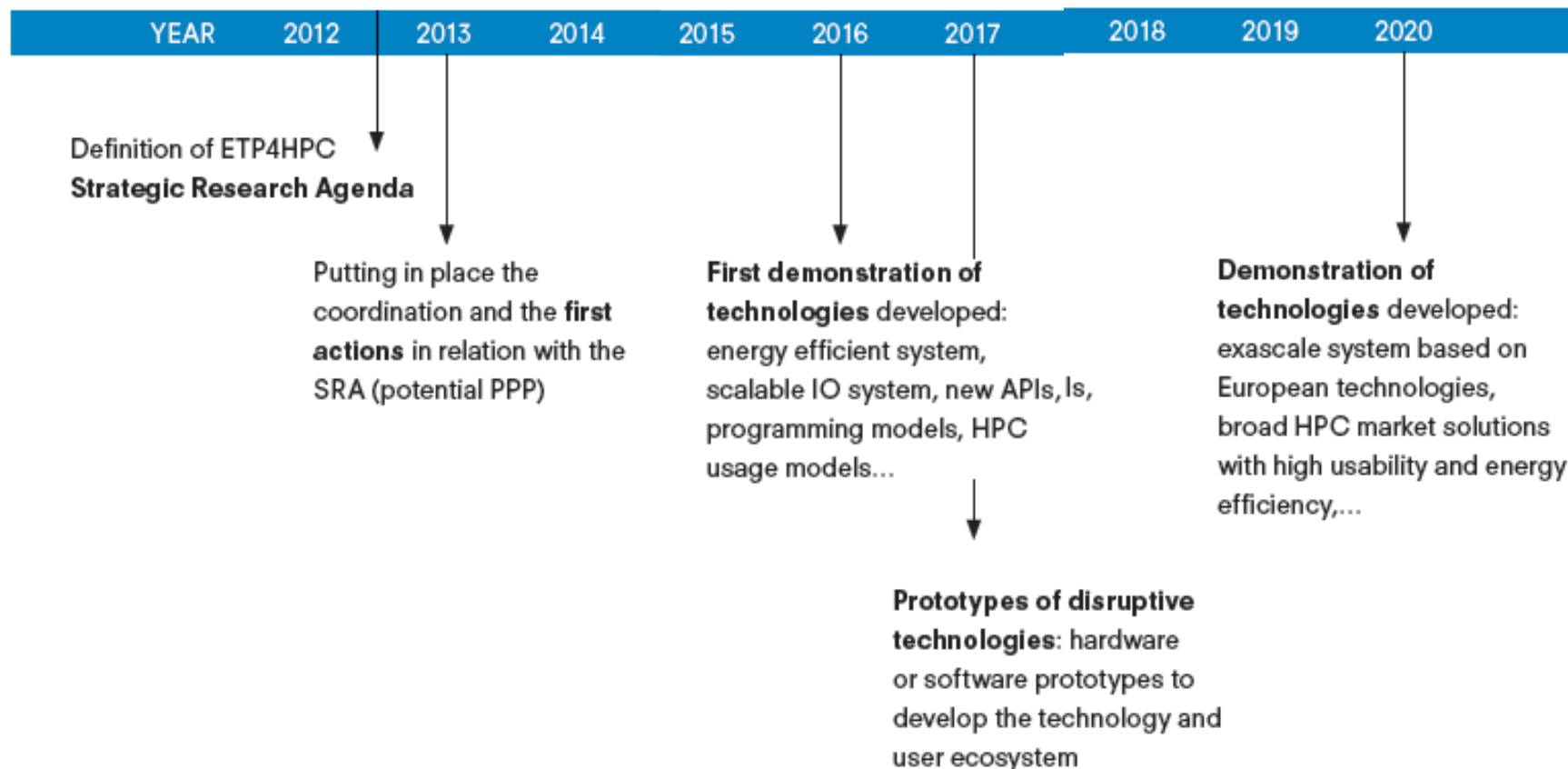
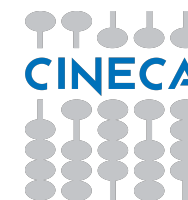
- The BDVA AISBL is a fully self-financed non-for-profit organization under Belgian law.
- Board: AnswareTech, Athens Technology Center, Atos SE, **Consorzio Interuniversitario Nazionale per l'Informatica (CINI)**, Engineering Ingegneria Informatica, Fraunhofer, German Research Center for Artificial Intelligence, IBM, INDRA Sistemas, Instituto Tecnológico de Informática (ITI), Intel, IT Innovation Centre, National University of Ireland Galway, Nokia, Orange, Philips, SAP, Siemens, Software AG, SINTEF, THALES, Universidad Politécnica de Madrid, Universität Duisburg Essen, VTT Technical Research Centre of Finland, Tilde, Telecom Italia, TNO, ZED Worldwide S.A
- **Cineca delegate: Roberta Turra**



# SRA: Strategic multi-dimensional vision



# SRA: Strategic multi-dimensional vision



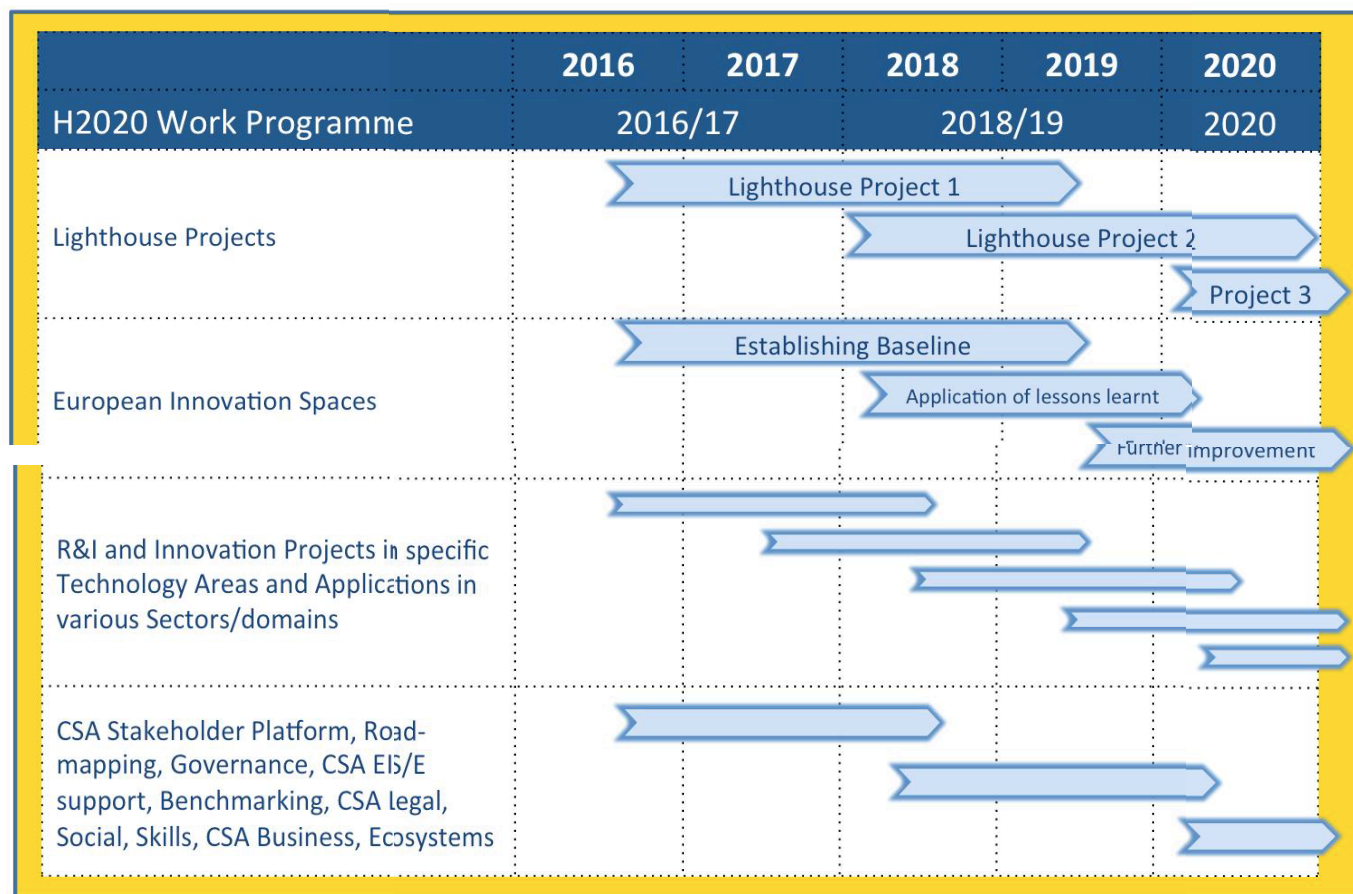
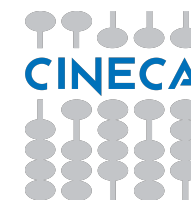
First phase of the European HPC  
technologies development

Second phase of the European  
HPC technologies development

Four kinds of mechanisms. In order implement the research and innovation strategy, and to align technical with cooperation and coordination aspects four major types of mechanisms are recommended:

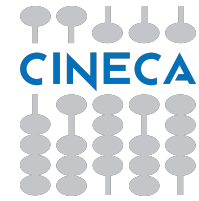
- **Innovation Spaces (i-Spaces):** Cross-organizational and cross-sectorial environments – will allow challenges to be addressed in an interdisciplinary way and will serve as a hub for other research and innovation activities.
- **Lighthouse projects:** These will help raise awareness of the opportunities offered by Big Data and the value of data-driven applications for different sectors and will act as an incubator for data-driven ecosystems.
- **Technical projects:** These will take up specific Big Data issues addressing targeted aspects of the technical priorities as defined in Section 3.
- **Cooperation and coordination projects:** These projects will foster international cooperation for efficient information exchange and coordination of activities.

# Mechanisms

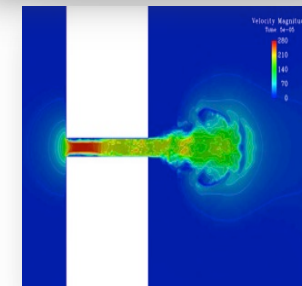
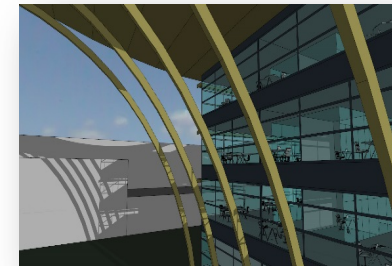


- Fortissimo e Fortissimo 2 sono tra i progetti finanziati nell'ambito del Factories of the Future PPP
- La FoF PPP è parte integrante della risposta di EC al crash finanziario del 2008
  - Distante da quelle che sono le Research Infrastructures
- E' gestito dall'unità *Technologies and Systems for Digitising Industry* all'interno di DG CONNECT Dir. A
- Fanno parte di un cluster di progetti seguiti dalle Innovation for Manufacturing SMEs (I4MS) CSAs

# Obiettivo e Ambizione di Fortissimo

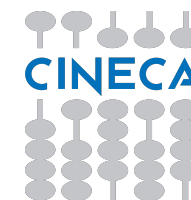


- **Obiettivo:** fornire alle PMI un accesso **facile** e **cost-effective** a **servizi di simulazione avanzata** attraverso una **infrastruttura Cloud** consistente di **risorse HPC e HPDA**, applicazioni software, competenze, e strumenti
- **Ambizione:** diventare **il portaledi riferimento** per la **fornitura di competenze e servizi HPC**, forniti dai maggiori HPC technology providers Europei



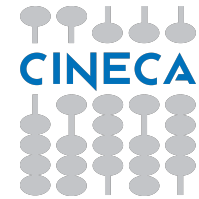
# I progetti Fortissimo in numeri

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- Fortissimo - €22m FP7 project – termina 12/2016
  - 122 partners
  - 53 ‘esperimenti’ in tre tranche **con impatto di business reale**
  - Focus su **simulazione e modellazione HPC-enabled** per **SMEs e Mid Caps manifatturiere**
- Fortissimo 2 - €11m H2020 project – termina 10/2018
  - 38 partners (probabilmente ca 80 alla fine)
  - 14 ‘esperimenti’ (probabilmente 34 alla fine – via 2 Open Calls)
  - In partenza 10 nuovi ‘esperimenti’ dalla Open Call 1
  - Al focus precedente si aggiunge **High Performance Data Analytics**

Sviluppati 17 progetti industriali di taglia 175-250k€



Manufacturing



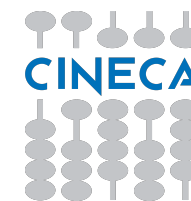
Engineering



Servizi



# Cerchiamo industrie che vogliano innovare



La nuova open call è aperta

I progetti sono di taglia ca. 175.000 € e dureranno 18 mesi

Il partenariato (preferibilmente internazionale) deve includere obbligatoriamente un'industria e un Resource Provider scelto tra i core partner di Fortissimo2. Altri partner che rendano il partenariato completo (università, centri di ricerca, ISV, ...) sono ammessi ma non obbligatori.

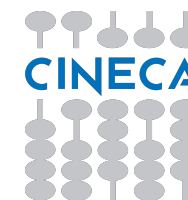
Il progetto deve avere come obiettivo l'implementazione in cloud di un servizio o un «proof of concept» che abbia un evidente impatto economico per l'azienda proponente.

**Deadline: 7 Dicembre 2016 h. 17:00**

**Claudio.Arlandini@cineca.it**



# Open innovation for SME – Waiting for approving



I termini del bando saranno i seguenti:

- Ciascun progetto avrà una durata temporale da 3 a 6 mesi
- Le risorse allocate da Cineca sul progetto saranno competenze specialistiche e/o risorse di calcolo/storage e saranno valorizzate in token.
- Complessivamente un progetto non potrà avere una dimensione inferiore a 250 token o superiore a 500 token

- I token sono valorizzati come in tabella:

Risorsa (unità)	Valore (token)
1.000 core hours di calcolo tecnico su calcolatore HPC	1
250 core hours su infrastruttura Big Data	1
1 giornata di supporto specialistico	2
1 TB di storage/mese	1

- Ciascun proponente è chiamato a contribuire con una quota pari a 100€ per token.

Tipo risorsa	Quantità	Valorizzazione Cineca	Finanziamento Richiesto	Valorizzazione (token)
<b>FTE Professionals con &gt; 7 anni di esperienza</b>	3 FTE	240.000 €	120.000 €	1.200
<b>Core hours di calcolo tecnico HPC</b>	500.000	100.000 €	50.000 €	500
<b>TB Storage HPC</b>	50	120.000 €	60.000 €	600
<b>Core hours di piattaforma Big Data</b>	100.000	80.000 €	40.000 €	400
<b>Totale</b>		540.000 €	270.000 €	2.700